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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/990,844 | 11/21/2001 | Thomas Klingenbrunn | 01P15526US | 2700 |

7590 03/29/2005

Siemens Corporation
Attn: Elsa Keller, Legal Administrator
Intellectual Property Department
186 Wood Avenue South
Iselin, NJ 08830

EXAMINER

WARE, CICELY Q

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2634

DATE MAILED: 03/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/990,844 | KLINGENBRUNN ET AL. | |
| | Examiner | Art Unit | |
| | Cicely Ware | 2634 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-21 is/are allowed.
- 6) ☒ Claim(s) 1,3,5-7,9,11 and 12 is/are rejected.
- 7) ☒ Claim(s) 2,4,8 and 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to because:
 - a. Examiner suggests applicant put all drawings in chronological order i.e. move Fig. 2 to first page of drawings after Fig. 1 for clarification purposes.

Specification

3. The disclosure is objected to because of the following informalities:
 - a. Pg. 4, line 13, applicant uses the phrase "shows the a trellis code". Examiner suggests using "shows a trellis code" for clarification purposes. Appropriate correction is required.
4. The specification has not been checked to the extent necessary to determine the

presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3, 5, 6, 7, 9, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Parizhsky (US Patent 5,588,028).

(1) With regard to claim 1. Parizhsky discloses a method of reducing the number of path metric calculations in the trellis of a Viterbi equalizer receiving a sequence of symbols, the method comprising the steps of: performing a preliminary decision of at least one of the previous symbols in the sequence of symbols; identifying a subset of destination states which are excluded from the calculation and determining for each of the remaining destination states a survivor path by comparing all path metrics to this state; determining the most likely of the survivor paths and determining the value of the oldest symbol in the symbol sequence from this survivor path; and generating the trellis by calculating path metrics only for states in which the oldest symbol is identical to the determined value (col. 3, lines 4- 19, col. 5, lines 13-18, 50-52, col. 6, lines 1-36, col. 8, lines 11-25, 46-54, col. 9, lines 3-10).

(2) With regard to claim 3, claim 3 inherits all the limitations of claim 1. Parizhsky further discloses wherein said method is executed depending on the channel power distribution (col. 9, lines 3-10).

(3) With regard to claim 5, claim 5 inherits all the limitations of claim 1. Parizhsky further discloses a method of determining a reduced trellis from a sequence of symbols in a Viterbi detector comprising the steps of: determining the value of a previous symbol from the sequence of symbols; and generating said reduced trellis by calculating only path metrics for states in which the previous symbol has the determined value (col. 3, lines 4- 19, col. 5, lines 13-18, 50-52, col. 6, lines 1-36, col. 8, lines 11-25, 46-54, col. 9, lines 3-10).

(4) With regard to claim 6, claim 6 inherits all the limitations of claim 5. Parizhsky further discloses wherein the step of determining comprises the steps of: determining at least one symbol from a previous determination including a plurality of current states; determining destination states for the determined symbol and determining a surviving path metric by comparing path metrics originating from the states of the determined symbol; and determining the value of a previous symbol with respect to the determined symbol of the surviving state (col. 6, lines 16-36).

(5) With regard to claim 7, claim 7 inherits all the limitations of claim 6. Parizhsky further discloses wherein the previous symbol is the oldest symbol (col. 8, lines 36-38).

(6) With regard to claim 9, claim 9 inherits all the limitations of claim 6. Parizhsky further discloses method is executed depending on power distribution of said sequence of symbols (col. 9, lines 3-10).

(7) With regard to claim 11, claim 11 inherits all the limitations of claim 1.

(8) With regard to claim 12, claim 12 inherits all the limitations of claim 11.

Parizhsky further discloses means for determining and said calculation means are implemented by a digital signal processor (col. 4, lines 29-37).

Allowable Subject Matter

7. Claims 2, 4, 8, 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for indication of allowable subject matter: The instant application discloses a method of reducing the number of path metric calculations in the trellis of a Viterbi equalizer receiving a sequence of symbols. Prior art references show similar methods but fail to teach: **“wherein the sequence comprises n symbols and said previous symbols are a sub-sequence of n-1 symbols and said preliminary decision of at least one symbol comprises a sub-sequence of up to the last n-2 symbols”**, as in claims 2 and 8; **“wherein the sequence comprises n symbols and said previous symbols are a sub-sequence of n-1 symbols and said preliminary decision of at least one symbol comprises a sub-sequence of up to the last n-2 symbols and wherein the power distribution of said n-2 symbols is below a predefined threshold”**, as in claims 4 and 10.

8. Claims 13-21 are allowed.

9. The following is a statement of reasons for indication of allowable subject matter:

The instant application discloses a method of reducing the number of path metric calculations in the trellis of a Viterbi equalizer receiving a sequence of symbols. Prior art references show similar methods but fail to teach: "a plurality of equalizers receiving said sequence of symbols each generating a trellis", as in claims 13 and 19.

Conclusion

10. The prior art made record of and not relied upon is considered pertinent to applicant's disclosure:

a. Krishnamoorthy et al. US Patent 6,356,586 discloses methods and apparatus for parallel decision-feedback decoding in a communication system.

b. Zangi et al. US Patent 6,707,849 discloses methods, receivers and equalizers having increased computational efficiency.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 571-272-3047.

The examiner can normally be reached on Monday – Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Art Unit: 2634

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Cicely Ware

cqw
March 3, 2005

A handwritten signature in black ink, appearing to read "Amanda T. Le". The signature is fluid and cursive, with a large initial "A" and a stylized "L".

AMANDA T. LE
PRIMARY EXAMINER